

Original Research Article

Comment [sn1]:

BIRTH PREPAREDNESS AND COMPLICATION READINESS AMONG PREGNANT WOMEN ATTENDING SELECTED HEALTH CENTRES IN ADO EKITI, EKITI STATE, NIGERIA

ABSTRACT

Introduction: This study assessed birth preparedness and complication readiness (BP/CR) and its associated factors among pregnant woman attending selected health care facilities in Ado-Ekiti, Ekiti state, Nigeria. **Methods:** A cross-sectional study design was employed. Two hundred and six pregnant women were randomly selected from four health care facilities. Data were analysed using descriptive, binary and multiple logistic regression analysis. The level of significance was set at $P < 0.05$. **Results:** The overall prevalence of BP/CR was 70.6%. About 81% already identified a place of delivery, 62% identified skilled birth attendant, and 87% saved money for delivery. However only few (16.3%) of the respondents made arrangement for blood donor in case of emergency. Religion, parity, and knowledge of at least two obstetric danger signs were significantly associated with the extent of BP/CR practice. Being a Christian (AOR = 6.15, 95% CI: 1.65 – 22.97) and having knowledge of at least two obstetric danger signs (AOR = 5.80, 95% CI: 1.81 – 18.56) were significant predictors of good BP/CR practices. **Conclusions:** Health care providers should stress the importance of identifying blood donor in case of emergency and antenatal clinics should be goal- and client-oriented and time effective. BP/CR should be made an integral part of maternal and child health services as the occurrences of complications during the process of childbirth are unpredictable.

Keywords: Birth preparedness; Complication readiness; Pregnant women; Antenatal; Obstetrics

Comment [sn2]: State the number of subjects against percentage to show burden in all data shown

26 1. INTRODUCTION

27 Globally, birth preparedness and complication readiness (BP/CR) has been endorsed as an
28 essential component of safe motherhood programmes [1]. A BP/CR plan includes: identification
29 of the preferred skilled birth attendant; funds required for birth related and emergency expenses;
30 preferred place of birth; support in looking after the home and children; a birth companion;
31 transport to health facility; transport in the case of an obstetric emergency; and identification of a
32 compatible blood donor in case of emergency [2]. However, BP/CR has not been easy to achieve
33 particularly in developing countries where most people live on less than US \$1 per day [2]. Most
34 health facilities are quite a distance to residential areas in developing countries. Even if vehicles
35 are available, poor roads and epileptic electricity supply may still cause delays that could put the
36 life of any pregnant woman at risk of death.

37 Maternal mortality has remained a major global public health concern especially in developing
38 countries where it is reported that 99% of these deaths occur [3]. In 2013, it was reported that
39 about 289,000 maternal deaths occurred worldwide and about 62% of these deaths occurred in
40 Sub-Saharan Africa where Nigeria belongs [4]. The 2013 report of the Nigeria demographic and
41 Health Survey (NDHS) puts the Maternal Mortality Ratio (MMR) at 576 deaths per 100,000 live
42 births [5]. This is estimated to account for 13% of the global maternal deaths. The report
43 revealed that approximately six women die per 1000 live births during pregnancy, during
44 childbirth or within two months of childbirth [5]. Despite efforts by governments to improve
45 maternal health, low BP/CR have been reported in most developing countries such as 47.8%
46 among pregnant women in Indora, India [6], 23% in Ghana [7], 17% in Ethiopia [8], 34.9% [9]
47 and 40.3% [10] in Nigeria.

48 The essence of BP/CR is because every pregnant woman is at risk of developing life-threatening
49 obstetric complications that could lead to maternal mortality. It is impossible to predict who
50 among pregnant women will develop complications that would lead to death or injury of the
51 mother, foetus and/or infant, hence the importance of BP/CR [2]. Care received from a skilled
52 healthcare provider during childbirth has been identified as the single most important factor for
53 safe delivery [11]. The lifetime risk of dying from pregnancy-related complications or during
54 childbirth is one in 1,800 in the developed countries compared to one in 48 in developing
55 countries [12]. This study therefore assessed birth preparedness and complication readiness and
56 its associated factors among pregnant woman attending antenatal clinics in Ado-Ekiti, Ekiti state,
57 Nigeria.

58 **2. MATERIALS AND METHODS**

59 **2.1. Study area**

60 The study took place in four different health facilities within Ado-Ekiti, the capital of Ekiti State.
61 Ado-Ekiti is an urban area situated in the Yoruba-speaking South-western region of Nigeria. The
62 health institutions studied include: Ekiti State University Teaching Hospital (EKSUTH),
63 Okeyinmi Comprehensive Primary Health Care Centre, Odo-Ado Primary Health Care Centre
64 and Oke-Oniyo Basic Health Care Centre.

65 **2.2. Study design**

66 The study design used was cross sectional. The study was carried out from November 2016 to
67 February 2017. The inclusion criteria were pregnant women, attending antenatal clinics at the
68 health facilities, at least two months of current pregnancy, domiciled in the study area and
69 voluntary participation. Non-residents, mentally disabled, visually impaired and auditory
70 impaired women were excluded from the study.

71 2.3. Sample size and sampling technique

72 The sample size calculation was determined by using a single population proportion formula for
73 cross sectional study.

$$n = \frac{Z^2_{1-\alpha/2} P(1 - P)}{d^2}$$

74 Z is the value of standard normal variable at 95% confidence interval, P is the prevalence of birth
75 preparedness and complication readiness from a study and d is the marginal error which is 5%.

76 n = sample size, $Z^2_{1-\alpha/2} = 1.96$, $P = 40\%$ [10], $d = 0.05$

77 $n = 188$

78 $n = 188 + (10\% \text{ non-response})$

79 $n = 206$

80 The estimated sample size needed for this study after adjusting for the non-respondents that may
81 be encountered was 206 participants.

82 The health clinics were randomly selected from the list of government health facilities in Ado-
83 Ekiti. The health facilities were visited on the antenatal clinic days. The participants were
84 recruited using each health facility's record book as sampling frame in order to make a random
85 selection of participants and to avoid selection bias. A proportionate allocation was done to
86 select the required number of participants from each health facility.

87 2.4. Instrument of data collection

88 A validated semi-structured questionnaire was used for data collection. The questionnaire was
89 adapted from the survey tools developed by JHPIEGO [1], consisting of three sections and was
90 in English language. Section A assessed the socio-demographic profile; section B assessed the
91 obstetric history and BP/CR practice, while section C assessed the respondents' knowledge of
92 BP/CR. Socio-demographic variables measured included age, ethnicity, educational level,

93 marital status and religion. Six variables were used to assess the extent of BP/CR practice
94 among the respondents. These six variables were selected after extensive literature review. The
95 questions asked included: identified place of delivery; transportation to health facility for
96 delivery; identified skilled birth attendant; saved money for delivery; made arrangement for
97 someone who will stay with family members; and made arrangement for blood donor in case of
98 emergency. The content and face validity of the questionnaire were ascertained by experts in the
99 fields of reproductive health and epidemiology. The questionnaire was pretested among 10 (5%
100 of the sample size) pregnant women from another health facility. The items on BP/CR practices
101 were scored with the total score ranging from zero to six. A woman was considered to have good
102 BP/CR if she practised at least four out of the six BP/CR indicators. Scores below four were
103 classified as poor BP/CR. Each respondent was informed about the purpose of the study and was
104 given instruction on how to complete the questionnaire.

105 **2.5. Ethics approval**

106 Ethical approval to carry out this study was obtained from the Ethics and Research Committee of
107 Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria. (Protocol number:
108 EKSUTH/A67/2017/02/008). Permissions were also obtained from all the health centres before
109 the survey. Verbal informed consent was obtained from all the respondents prior to their
110 inclusion in the study. Their rights to decline participation were clearly explained to them.

111 **2.6. Data analysis**

112 The questionnaires were checked for completeness and consistencies. Data were then coded,
113 entered, cleaned and analysed using SPSS version 21.0. Descriptive statistics were presented in
114 frequencies and percentages. Continuous variables were presented in their means, odd ratio with
115 their 95% confidence intervals (CI). Bivariate analyses to assess factors associated with BP/CR

Comment [sn3]: Permission..was

were done using Pearson Chi-Squared test and Fishers exact test. A multiple logistic regression analysis was also done to identify factors that predict BP/CR while controlling for possible confounders. The level of significance was set at 5%.

3. RESULTS

A total of 206 questionnaires were administered. Only 184 were recovered giving a response rate of 89.3%. The mean age of the respondents was 29.70 years (95% CI: 28.95 – 30.44). The ages of the women ranged from 20 – 44 years. The socio-demographic profile of the respondents (Table 1) shows that majority of the respondents were between the ages of 20 – 29 years (46.7%), married (96.2%), Yoruba (85.9%), Christians (89.1%) and obtained a tertiary institution qualification (61.4%).

Table 2 shows the obstetric history of the respondents. Approximately 66% of the respondents' gestational age was five months and above. Only 12% reported ever having miscarriage and 5.4% had complications in their previous deliveries. In a bid to assess the BP/CR of the respondents, Table 3 shows that 81.0% had identified a place of delivery, 62% identified skilled birth attendant, 87% saved money for delivery and only 16.3% made arrangement for blood donor in case of emergency.

A chi-square test of association was conducted to ascertain factors associated with BP/CR. Table 4 shows that religion ($P = 0.007$), parity status ($P = 0.039$) awareness of BP/CR ($P = 0.009$) and knowledge of at least two obstetric danger signs ($P < 0.001$) were significantly associated with BP/CR. Christians were found to practice good BP/CR than Muslims. Those who have ever had children were more prepared than those who have never had children. Those who have heard about BP/CR were also found to have good BP/CR.

Comment [sn4]: Discuss if this loss of subjects against sample size will affect data analysis
Was this anticipated- could more subjects have been recruited based on expected loss of recruitment for analysis?
State this under limitations and need for further studies

139 **Table 1: Socio-demographic characteristics of respondents**

Socio-demographic characteristics	Frequency (n=184)	Percentage
Age		
20-29	86	46.7
30-39	70	38.1
40 and above	5	2.7
No response	23	12.5
Marital Status		
Single	3	1.6
Married	177	96.2
Divorced	1	0.6
No response	3	1.6
Ethnicity		
Yoruba	158	85.9
Igbo	19	10.3
Others	2	1.1
No response	5	2.7
Religion		
Christianity	164	89.1
Islam	16	8.7
No response	4	2.2
Educational qualification		
No formal Education	5	2.7
Primary	8	4.4
Secondary	49	26.6
Tertiary	113	61.4
No response	9	4.9
Health facility		
EKSUTH	62	33.7
Odo-Ado	65	35.3
Okeyinmi	35	19.0
Oke-Oniyo	22	12.0

141 **Table 2: Obstetric history of respondents**

Variables	Frequency (n=184)	Percentage
Gestational age (in months)		
2-4	6	3.3
5-7	52	28.2
8-10	69	37.5
No response	57	31.0
Parity		
Nulliparous	53	28.8
Primigravida	48	26.1
Multiparous	58	31.5
Grand multiparous	6	3.3
No response	19	10.3
Ever had any miscarriage		
Yes	22	12.0
No	160	87.0
No response	2	1.0
Complication during the previous deliveries		
Yes	10	5.4
No	159	86.4
No response	15	8.2
Previous surgery on reproductive organ		
Yes	12	6.5
No	165	89.7
No response	7	3.8

142

143 **Table 3: Birth preparedness and complication readiness practices**

Variables	Yes	
	n	%
Identified place of delivery	149	81.0
Transportation to health facility for delivery	141	76.6
Identified skilled birth attendant	114	62.0
Saved money for delivery	160	87.0
Made arrangement for someone who will stay with other family members	103	56.0
Made arrangement for blood donor in case of emergency	30	16.3

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Table 4: Factors associated with birth preparedness and complication readiness (BP/CR)

Variables	Poor BP/CR		Good BP/CR		χ^2 /Fisher's	P value
	n	%	n	%		
Overall (n=177)	52	29.4	125	70.6		
Age						
20 – 29	24	28.9	59	71.7	1.231	0.642
30 – 39	17	25.0	51	75.0		
40 and above	0	0.0	4	100.0		
Marital status						
Single	2	66.7	1	33.3	2.554	0.430
Married	48	28.2	122	71.8		
Divorced	0	0.0	1	100		
Ethnicity						
Yoruba	41	27.0	111	73.0	4.394	0.083
Igbo	9	50.0	9	50.0		
Others	0	0.0	2	100.0		
Religion						
Christianity	42	26.6	116	73.4	7.359	0.007*
Islam	9	60.0	6	40.0		
Educational qualification						
No formal education	1	20.0	4	80.0	0.622	0.951
Primary	3	37.5	5	62.5		
Secondary	14	29.8	33	70.2		
Tertiary	31	28.7	77	71.3		
Health facility						
EKSUTH	19	31.1	42	68.9	6.585	0.086
Odo-Ado	13	21.3	48	78.7		
Okeyinmi	9	27.3	24	72.7		
Oke-Oniyo	11	50.0	11	50.0		
Gestational age (months)						
2 – 4	2	50.0	2	50.0	2.105	0.290
5 – 7	13	25.5	38	74.5		
8 – 10	14	20.9	53	79.1		
Parity						
Nulliparous	22	43.1	29	56.9	8.369	0.039*
Primigravida	8	17.4	38	82.6		
Multiparous	15	26.3	42	73.7		
Grand multiparous	1	20.0	4	80.0		
Miscarriage history						
Yes	4	18.2	18	81.8	1.464	0.226
No	47	30.7	106	69.3		

Variables	Poor BP/CR		Good BP/CR		χ^2 /Fisher's	P value
	n	%	n	%		
Pregnancy complication history						
Yes	3	33.3	6	66.7	0.225	0.635
No	40	26.1	113	73.9		
Reproductive surgery history						
Yes	3	25.0	9	75.0	0.067	0.796
No	45	28.5	113	71.5		
Ever heard of BP/CR						
Yes	28	23.0	94	77.0	6.897	0.009*
No	20	43.5	26	56.5		
Knowledge of at least two obstetric danger signs						
Yes	5	9.8	46	90.2	13.231	<0.001*
No	47	37.3	79	62.7		

*p value significant at 0.05

Comment [sn5]: Footnote for abbreviations

The simple logistic model (Table 5) showed that being a Christian (COR = 4.14, 95% CI: 1.39–12.34), ever heard of BP/CR (COR = 2.58, 95% CI: 1.26–5.30) and knowledge of at least two obstetric danger signs (COR = 5.47, 95% CI: 2.03 – 14.75) were significant predictors of being well prepared. The adjusted multivariate model however showed that significant predictors for being well prepared for birth and complications are being a Christian (AOR = 6.15, 95% CI: 1.65 – 22.97) and knowledge of at least two obstetric danger signs (AOR = 5.80, 95% CI: 1.81 – 18.56).

158 **Table 5: Multivariate logistic regression of BP/CR**

Variables	Crude OR			Adjusted OR		
	OR	95%CI	p-value	OR	95%CI	p-value
Religion						
Islam	Ref.			Ref.		
Christianity	4.14	1.39 – 12.34	0.011	6.15	1.65 – 22.97	0.007*
Health facility						
Oke-Oniyo	Ref.			Ref.		
EKSUTH	2.21	0.82 – 5.99	0.119	1.36	0.38 – 4.87	0.641
Odo-Ado	3.69	1.31 – 10.41	0.013	2.45	0.69 – 8.76	0.167
Okeyinmi	2.67	0.86 – 8.29	0.090	3.09	0.77 – 12.36	0.110
Miscarriage history						
No	Ref.			Ref.		
Yes	2.00	0.64 – 6.22	0.234	1.82	0.50 – 6.64	0.362
Ever heard of BP/CR						
No	Ref.			Ref.		
Yes	2.58	1.26 – 5.30	0.010	2.24	0.94 – 5.32	0.069
Knowledge of at least two obstetric danger signs						
No	Ref.			Ref.		
Yes	5.47	2.03 – 14.75	0.001	5.80	1.81 – 18.56	0.003*

159 *p value significant at 0.05

160

161 4. DISCUSSION

162 This study revealed that the prevalence of BP/CR was 70.6%. Nearly all passed all the six
163 indicators used for determining BP/CR except the fact that only 16.3% made arrangement for
164 blood donors and 56% made arrangement for someone to stay with their family members while
165 they go for delivery. The percentage of women who were prepared (70.6%) in our study, is
166 higher than 40.3% reported in Ogbomoso, Nigeria [10], 47.8% in Indore, India [6], 23% in
167 Jimma, Ethiopia [13], 29.9% in Oromia region in Ethiopia [14], 23% in Ghana [7] and 58.2% in
168 Chamwino, Tanzania [15]. The difference observed in this study could have been because the
169 study was carried out in an urban location where 88% of the women sampled had secondary

170 and/or tertiary education. A similar study conducted among women in Edo state, Nigeria
171 reported that 87.4% of the women sampled were well prepared for birth [16]. It could also be
172 because about 70% of the respondents have heard of BP/CR.

173 The BP/CR most practiced among the respondents was to save money for delivery (87%). This
174 shows that the pregnant women must have perceived that money has the most important role to
175 play in BP/CR. The place of delivery (81%) was another important factor considered by the
176 respondents. These two factors were also the most important ones reported among Ethiopian
177 women [17]. Gebre and colleagues [12] in their study among 578 pregnant women also reported
178 that money saved was the highest BP/CR practice among the respondents.

179 In this study, we found out that as the age increased, the practice of BP/CR increased. All
180 (100%) those who were 40 years and above were well prepared. This could have been because
181 they have had experience in child bearing. Married women (71.8%) and the divorcee (100%)
182 were more prepared than single women (33.3%). However, this was not statistically significant.
183 Marital status of a woman plays an important role is good BP/CR. In a Nigerian setting,
184 pregnancy is a thing of joy in any marriage. This could be the more reason why women prepare
185 for the arrival of the new born baby. It is most likely that the single women who get pregnant
186 would have loved not to get pregnant and would not consider abortion as an option. Hiluf and
187 Fantahun [17] also reported married women being more likely to be prepared than non-married
188 women.

189 Educational qualification, health facility and gestational age played insignificant roles in BP/CR
190 among pregnant women in this study. In contrast, several studies found respondents' level of
191 education to be significantly associated with BP/CR practice [7, 16, 18, 19]. The association
192 must have been missing in this study probably because of the high level of education of most

193 respondents and the urban area they live. A study reported the odds of BP/CR were two times
194 greater (AOR = 2.01, 95% CI = 1.20, 3.36) among urban residents than rural residents [14]. Most
195 studies were carried out in communities unlike this study which was hospital-based.

196 The bivariate analysis showed that there was a statistically significant association between parity
197 and BP/CR. Women with parity of one and above were more prepared than nulliparous (no
198 previous delivery). This association between parity and BP/CR has also been reported by other
199 studies [17, 19]. In this study, women who had miscarriage history were more prepared for birth
200 and its complications than women who never had miscarriage. In contrast, there was no
201 difference in BP/CR among those who had pregnancy complication history or not. Both
202 miscarriage history and pregnancy complication history did not show any statistically significant
203 association with BP/CR. Some studies reported that women who had history of stillbirth were
204 about three times and four times respectively more likely to be prepared than women who never
205 had still birth [17, 18]. The BP/CR of women with history of miscarriage or still birth could have
206 been to avoid recurrence.

207 Those who have ever heard of BP/CR were more prepared for birth and its complications than
208 those who have never heard of it. This study revealed that knowledge of BP/CR was statistically
209 significant in influencing the preparedness of pregnant women towards birth and its
210 complications. This is the more reason that women, irrespective of their marital status should be
211 enlightened on BP/CR. In this study, only 46 (27.4%) reported that they have never heard of
212 BP/CR. This is lower than 53.6% reported among Ethiopian women [14]. This wide-gap
213 difference could have occurred due to the fact that only 21.2% of the respondents in their study
214 had Secondary education and above compared to 88% in this study.

215 Christians were seven times more likely to be prepared for birth and its complications than
216 Muslims (AOR = 6.15, 95% CI: 1.65 – 22.97). This could have been because besides health
217 facilities, Christians do patronise birth attendants. Some churches employ birth attendants in their
218 churches or clinics. There is a possibility that these Christian women must have been educated
219 on the importance of BP/CR. This study found out that the proportion (73.4%) was significantly
220 higher among Christians than other religions. This finding is similar to that reported in a study in
221 Nigeria (76.4%) [10],

222 Knowledge of at least two obstetric danger signs was significantly associated with BP/CR.
223 Nearly all (90.2%) of those who had knowledge on at least two obstetric dangers signs were
224 prepared for birth and its complications. This prevalence is higher compared to 34.8% Nepalese
225 women who had knowledge on at least two danger signs during pregnancy [20] and 13%
226 Ethiopian women [18]. The logistic regression model revealed that those who had knowledge on
227 obstetric danger signs were 5.8 times more likely to be prepared than those who do not have the
228 knowledge. Gebre and colleagues [12] reported that having knowledge of at least two danger
229 signs during pregnancy is a significant predictor of BP/CR (AOR= 2.81, 95% CI: 1.69–4.67).
230 This is also similar to AOR = 2.94, 95% CI = 1.61 – 5.37 reported in Robe Woreda, Ethiopia
231 [18]. Markos and Bogale [14] in their study among Ethiopian women of child bearing age found
232 out that having knowledge about key danger signs during pregnancy is a significant predictor of
233 BP/CR (AOR = 1.74, 95% CI: 1.06 – 2.88).

234 4.1. Strengths and Limitations

235 The strength of the study lies in the fact that only pregnant women were sampled in this study.
236 Selection bias was overcome by random selection of participants. Recall bias was also reduced
237 by asking questions on what happened in recent times among those who are currently pregnant.

Comment [sn6]: Under Methods include a paragraph as to how the questionnaire was administered, time duration (mins) when administered , by whom-trained , same personal etc

238 The limitations of the study include the inability of this study to establish a causal relationship
239 and the authenticity of the answers cannot be verified because they were based on self-report.

Comment [sn7]: This relates to above comment on how questionnaire was administered and how informed consent was take (as oral- if she refused then another subject was selected)

240 5. CONCLUSION

241 The prevalence of BP/CR (70.6%) among pregnant women attending selected health facilities in
242 Ado-Ekiti, Nigeria is high. Religion, parity, awareness of BP/CR and knowledge of at least two
243 obstetric danger signs were significantly associated with BP/CR practice. Being a Christian and
244 having knowledge of at least two obstetric danger signs were significant predictors of good
245 BP/CR practices. It is not unlikely that difference in study area, socio-cultural characteristics and
246 implementation of related health program would have played their roles in the outcome of this
247 study compared to other studies.

Comment [sn8]: There were some useful information derived – Christians were better informed compared to Muslims- further studies to explore this and exploit the inferred data for healthcare providers- Another point was that primigravid women were less prepared- Both these issues relate to health education of vulnerable population- so make suggestions as part of conclusion. Also state in limitations the fall out of subjects for analysis as you did not meet the required sample size.

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